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ABSTRACT

Many schools have established their own remedial educational programs to help students at relatively high risk of academic failure. Traditionally such remediation programs have been designed to remediate knowledge of specific content or teach study skills. Such courses have been generally ineffective. This study examined the teaching of thinking to academic underachievers based on one component (Organization of Dots) of the Feuerstein Instrumental Enrichment (IE) remedial techniques. Fifteen tutors in four tuition centers were trained to work with this course of study. A total of 140 pupils from different primary school levels were split into control and experimental groups, both of which were tested before and after the experimental program of IE. The experimental group received a combination of IE and the usual conventional academic programs provided by the schools. The control group received only the academic programs. The program was administered to students in attendance at the tuition centers. The study subjects, although not formally classified as learning disabled, displayed learning characteristics of slow learners and underachievers. The Ravens Standard Progressive Matrices, as well as Feuerstein's pre-post measures were utilized. Preliminary findings seemed to suggest that cognitive skills can be transferred to new subjects if children are exposed to IE for a longer rather than a shorter period of time. For significant changes to take place, a minimum requirement of 300 hours spread out over a 2- to 3-year period for all the 14 instruments is recommended. The training of teachers is obviously very important to the success of this program. (ABL)

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FEUERSTEIN'S INSTRUMENTAL ENRICHMENT : AN EXPLORATORY STUDY FOR ACTIVATING INTELLECTUAL POTENTIAL IN SLOW LEARNERS

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FEUERSTEIN'S INSTRUMENTAL ENRICHMENT : AN EXPLORATORY STUDY FOR ACTIVATING INTELLECTUAL POTENTIAL IN SLOW LEARNERS

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Many schools have established their own remedial educational programs to help students at relatively high risk of academic failure. Traditionally such remediation programs have been designed to remediate knowledge of specific content or teach study skills. Such courses have been generally ineffective.

Recently developed programs seem to indicate a shift in emphasis from remediation of academic and/or study skills to remediation of cognitive processes.An instructional program holding particular promise for modifying cognitive processes is Feuerstein's Instrumental Enrichment.(Feuerstein 1980). His theory of cognitive modifiability is finding continued interest and support among many professionals in the fields of psychology and education.

The purpose of this paper is to describe an explo ratory study into the teaching of thinking to academic underachievers based on one component (Organisation of Dots) of the Feuerstien's remedial techniques. 15 tutors in four tuition centers have been trained to work with this course of study and have used it with 140 pupils from different primary school levels.The program was administered to students in attendance at these tuition centers. The subjects of the study although not formally classified as learning disabled displayed learning characteristics of slow learners and underachievers. The Ravens Standard Progressive Matrices as well as a Feuerstein's pre-post measures were utilized. Results indicated that the treatment had made an impact on the subjects.

This paper is based on the responses of the pupils and the tutors and the observation of a group of independent evaluators in the respective centres. The study hopes to interest those concerned to help slow learners acquire tools for thinking and solving problems.

In recent years a good deal of interest has been expressed concerning the possibility of teaching thinking skills and a number of techniques purporting to teach such skills have been developed. In most cases, however these techniques have not been subjected to much empirical testing by researchers other than the ones who originally developed them and it is often difficult to assess the claims made on their behalf. An exception to this generali sation is a technique developed by Reuven Feuerstein and his colleagues, (Feuerstein, Rand, Hoffman and Miller 1980) sometimes referred to as 'Instrumental Enrichment' (IE) and sometimes as 'Feuerstein's Instrumental Enrichment' (FIE).

This technique was developed for use with culturally disadvantaged, low performing Israeli adolescents. Feuerstein et.al. (1980 p69) make the point, however, that although the materials were developed for use with adolescents, the principles are applicable to all age groups. In Singapore, difficulties in school learning occur at many levels and range from very specific to more generalised problems as the conditions we call learning disability tend to suggest. Perhaps the most pervasive problem confronted by schools is the difficulty for some students in thinking how to think and in learning how to learn. This can be in a narrow field or in the broader sense, both indicative of a reduced ability to adapt to novel events and situations in the environment.

According to Feuerstein, increasing numbers of children who experience difficulties in learning are being called learning disabled. Presumably the ability, or some part of it, that facilitates learning in so called normal individuals is absent or deficient in the learning-disabled person. In this sense, special education means education for special or disabled people. This approach to the problem of the nonlearner or low-functioning individual has been criticized because it places the locus of the problem within the individual. In other words, it is not the individual's performance that is low, rather, it is his/her competence to learn that is impaired. It has been suggested that learning disability might be more appropriately called teaching disability. Implication is that the locus of the problem does not lie with the child: it lies with the teacher who is unable to impart learning to the child.

This view however does not contain the whole truth. It is more plausible to explain that learning, or at least some part of it, is a product of the interaction between the teacher and the learner. If so, the disability may reside in the nature of the interaction itself.

Instrumental Enrichment is based on the work of Feuerstein and his colleagues during the 1950s while wrestling with the problem of integrating large numbers of children immigrating into Israel after the Second World War. Feuerstein questioned the relevancy of the commonly used standard measures of intelligence, claiming such measures were invalid after using them with these children, who came from a variety of different cultural backgrounds. He developed a new intelligence measure, The Learning Potential Assessment Device (LPAD) which is designed to measure a child's potential to learn.

From his work with intelligence testing, Feuerstein and his colleagues developed Instrumental Enrichment(IE), which originally sought to modify an adolescent's cognitive structures and render the individual open to new experiences. IE has since been used with all ages and with a wide range of population including the gifted,to teach meta-cognition, or an awareness of one's thinking processes.

Feuerstein maintains that many problems in learning are the result of insufficient or inadequate mediated learning experiences. The IE program is an intervention designed to compensate for this by systematic training in learning and problem solving skills. The central concept of Feuerstein's theory explaining the development of cognition in individuals is known as Structural Cognitive Modifiabilty (SCM). This is defined as the capacity of individuals to change or modify the structure, or learning sets of their cognitive functioning in response to the changing demands of their environments.

Mediated learning experience is a qualitative interaction between the adult caregiver and the child that is not directly and/or exclusively dependent on environmental conditions. In contrast to learning by direct exposure, mediated learning occurs when a mediator interposes himself between the learner and the environment and interprets the world to the learner. Thus mediated learning experience is not necessarily synonymous with social interaction. The issue is not whether the individual receives stimulus information from inanimate or animate sources but the kind of information that is received. The essence of a

mediated interaction is that in the process of mediating information, a transformation occurs that facilitates the transmission of meaning not inherent in the raw stimulus or sensory information.

Feuerstein states that it is because of the presence of the mediated learning experience that structural cognitive development takes place in the minds of individuals. This in turn makes the individual capable of benefitting from the wide range of experiences that life offers and he is able to be modified in a constructive way by these experiences.

One of the anticipated results of providing children with mediated learning experience is that they would become more aware of their cognitive processes and abilities, that is, they would exhibit an increase in their meta cognitive activity. Feuerstein is particularly concerned with children who exhibit an impulsive problem-solving style, since this style is so often found to be ineffective and he is also concerned that children should be able consistently to generalise from their experience and to adopt an abstract rather than a concrete cognitive style.

The Organisation of Dots

IE consists of 14 packages or Instruments of paper and pencil exercises, with each Instrument capable of involving all of Feuerstein's list of cognitive functions.

The Organisation of Dots is the first instrument in the series, included in a single booklet with each page typically presenting a number of problems for the students to solve. On the cover of the booklet is printed the slogan for the program "Just a minute - let me think" with a drawing of a young man in thought. The booklet is divided into sections, each emphasising a particular cognitive skill or strategy. Every page presents the student with a set of dots; the student is asked to draw lines connecting the dots in a way that makes the resulting drawings match a model pattern that is presented. The problems get more difficult as the student works through the booklet.

In fact, the first basic exercise involves many intellectual functions that, if absent would lead the child being unable to complete the task. The instrument is designed to correct cognitive failings and to train the child to have clear perception, to have a sufficiently adequate spatial awareness, to recognise similar patterns and to appreciate and conserve in his mind the stable characteristics of an object. It trains the child to search

systematically and to formulate hypotheses about the whereabouts of the pattern rather than to rush in impulsively.

Precision and accuracy are stressed in the instrument because, without careful analysis of the size of the dots, their distance, angles and orientation, it is impossible to find the shapes. The whole instrument requires the child to project relationships onto a disordered situation and make sense out of it.

The Exploratory Study

As an exploratory study, the Organisation of Dots was presented to a group of 140 students from various primary schools in Singapore.The sample was split into a control and experimental group both of which were tested before and after the experimental program of IE (Organisation of Dots) was given for a period of four months. The experimental group received a combination of IE and the usual conventional academic programs in schools. The control group received only the academic programs. The students attend classes in the four tuition centers centers once a week for about two hours each time. These students (average age 11 years old) are considered as slow in learning in schools. They are perceived by their school teachers to have difficulties in concentrating, to have poor study skills and work habits and to be lacking in confidence and motivation.

15 tutors participating in the program were exposed to Feuerstein's philosophy and methods by means of a workshop. They received supervision twice a month for the duration of the period when Organisation of Dots was used. Work on the actual pages of the Organisation of Dots was interspersed with direct and explicit "bridging" to the academic subjects as well as to everyday life situations. The tutors were given field coaching and follow up sessions and were encouraged to keep anecdotal logs of their pupils. At the close of the training program, a simple survey of tutors' attitude towards the program was conducted.

Before the children were started on the program, all were measured on the Raven's Standard Progressive Matrices and the Cognitive Abilities Test. A record of their class tests in Mathematics and English was also compiled.

Results

The results of this exploratory study provide a little insight on the students' performance and more into the tutors' views and their attitudes towards the program. Results showed that the IE classes in 3 out of the 4 tuition centers had done better in their school tests in Mathematics. Their English scores however did not show significant improvement. There was also no significant gain in their RPM and cognitive tests.

The survey of the tutors' attitude towards IE was most encouraging. 80% of the tutors agreed that Organisation of Dots aroused interest in their classes and 85% said they thought the program capable of changing their students' thinking. 90% stated that they had benefitted in their teaching as a result of the training. Another 60% indicated that Organisation of Dots had improved their students' cooperative skills, mainly due to the group work techniques used.

The tutors' anecdotal logs revealed that the pupils had enjoyed the lessons from the Organisation of Dots very much. Some felt that the program had helped some children to become more thoughtful and less impulsive. However three tutors indicated that some children in their classes wanted to rush ahead on the exercises (kia-su syndrome as known in Singapore) and the three of them had to prepare extra exercises for these children.

All the tutors are unanimous in agreeing that the structured and progressive sequencing of the Organisation of Dots lessons has been very helpful to their pupils in mainly reducing impulsiveness. It also helped them (the tutors) to plan their work carefully and they become more reflective as a result.

Discussion

The results so far from this preliminary study should be viewed with some caution due to the short period within which the first instrument had been taught and administered to the slow learners. Since the role of the tutor is crucial in producing the necessary mediated learning experiences through the IE exercises, any teacher indifference or ignorance is bound to have very negative effects.

One major problem is the tendency of the teacher to reduce the IE set into a series of simple exercises. To carry out the program properly requires a change in personal attitude, teaching objectives and teaching styles. The process of thinking rather than the product of thinking becomes more important. The program relies heavily on the continual interaction between teacher and class and between the pupils in the same class. The teacher thus becomes a guide and a participant in problem solving rather than a donor of knowledge.

One of the main problems discussed by the tutors was the difficulty in coping with different levels of ability within the class. It was noted that many of the older children become more willing to engage in discussion whereas the younger children simply enjoy the exercises without gaining anything much.

Some tutors apparently found bridging very difficult and they did try hard to prepare alot of bridging ideas before they started a lesson. One particularly interesting finding is that the more experienced tutors found the program requiring a great deal of teacher-direction, class discussion and interaction all at the same time. This was quite difficult for them to carry out.

Preliminary findings seem to suggest that cognitive skills can be transferred to new subjects if children are exposed to IE for a longer rather than a shorter period of time.For significant changes to take place, a recommended minimum requirement of 300 hours spread out over a two to three year period for all the 14 instruments is suggested by Feuerstein.

The training of teachers is obviously very important to the success of this program. They need to be thoroughly grounded in the theory of mediated learning and cognitive modifiability in order to appreciate the purpose and benefits of the program in the schools. What this also involves is a commitment to a particular view of learning.

This brief paper has centered on a pilot study on how to activate the cognitive potential in slow learners. It is a small scale investigation still in its exploratory stage. Hopefully it will provide some information about

exactly how teachers prepare to work as mediators with small groups of children, exactly what they did and how the children in their groups responded. There are nevertheless other variables which have not been investigated - for example the amount of time necessary to devote to IE before it begins to take effect or a much more closer monitoring of the control group in the program.

IE also needs to be compared and tested with other remedial programs and since it is based on an interactionist view of development, there is a need for a formative as well as a summative evaluation of the program.

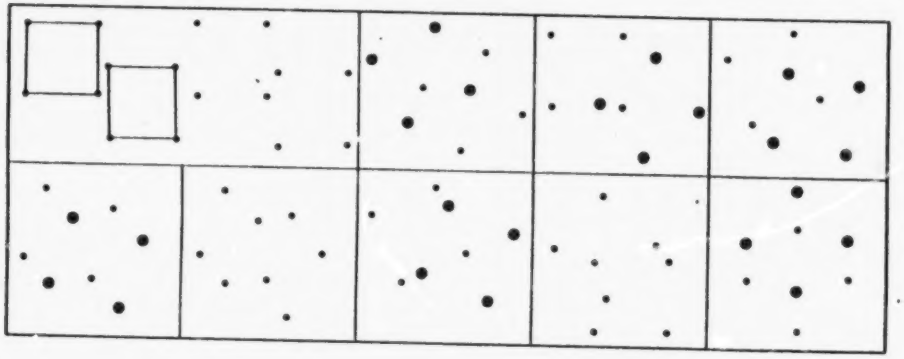
Feuerstein, R. with Rand,Y., Hoffman, M. and Miller, R.
Instrumental Enrichment Baltimore. University Park Press, 1980.

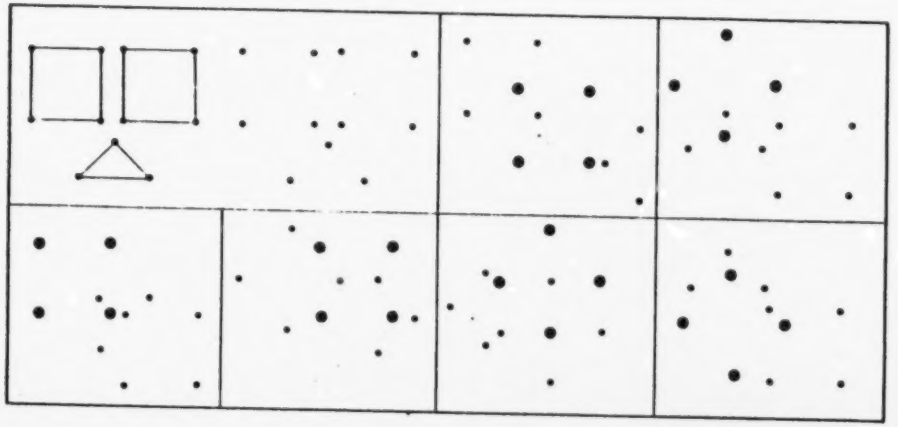
EXAMPLES FROM ORGANIZATION OF DOTS

The student must perceive the dots in an amorphous, irregular cloud so as to project figures identical in form and size to those in the given models. The task becomes more complicated by density of the dots, overlapping, increasing complexity of the figures, and changes in their orientation. Successful completion demands segregation and articulation of the field.

Among the cognitive functions involved are:

- Projection of virtual relationships
- Discrimination of form and size
- Constancy of form and size across changes in orientation
- Use of relevant information
- Discovery of strategies
- Perspective
- Restraint of impulsivity





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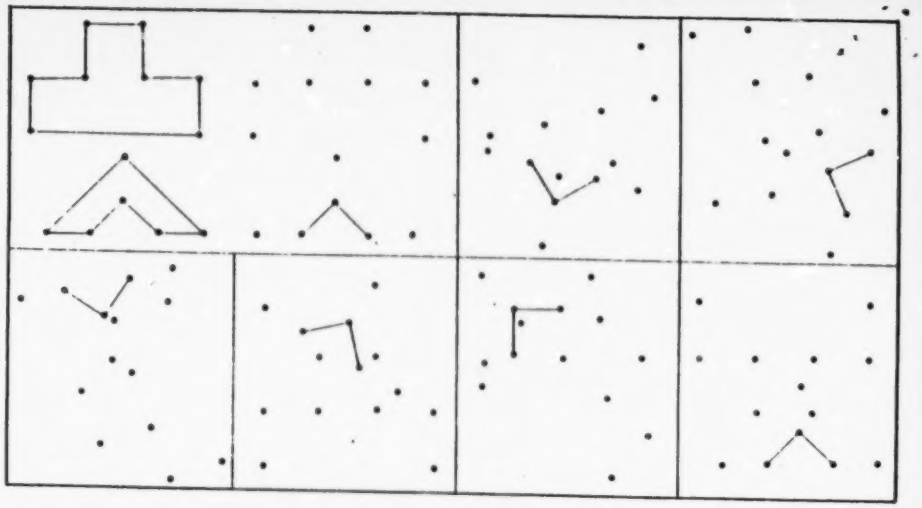
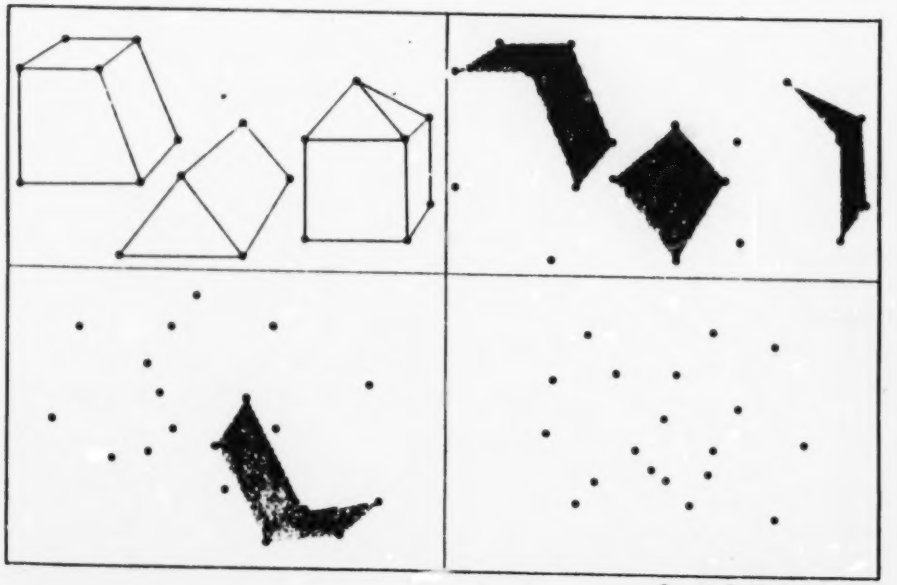
The thickened dots aid in projecting the square, but also serve as a distractor and prevent the perception of similarities between frames. In addition to the functions and operations listed on the title page (left), the tasks involve labeling, precision and accuracy, planning, determination of starting point, systematic search, and comparison to model. Successful completion aids in creation and maintenance of motivation.



An asymmetric figure in the model necessitates representational re-orientation in space. The provided cues are reduced until extinction so that an alternate starting point must be found. Scientific thought: hypothesis, investigation, and confirmation, as well as logical evidence, are necessary.



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Addition of the third dimension complicates differentiation, internalization, and spatial orientation. A dot, instead of connecting only two lines, serves as a nexus of 3 or more lines. The shaded cue is a synthesized whole, formed from parts separate in the model and each cue is relevant to a different form in the model.